

the body of the fish whilst swimming; and it is evident that, in fishes moving during a great part of their life over swampy ground, or through more or less consistent mud, this function of the ventral fins ceases, and that nature can readily dispense with these organs altogether.

XL.—Remarks upon Oceanic Forms of Hydrozoa observed at Sea.
By CUTHBERT COLLINGWOOD, M.A., F.L.S. &c.

THE following observations were made during a prolonged sea-voyage, extending over a year and a half, and embracing the Indian Ocean north and south of the Line, the China Seas, and the North and South Atlantic Oceans. During this voyage, of course, many interesting observations were made relating to other animals; but the present paper will be confined to the oceanic Hydrozoa of the orders Physophoridæ and Lucernaridæ.

The appearance of these animals is by no means a constant occurrence even in calm seas, and seems in fact to be somewhat capricious and regulated by conditions which are not well ascertained and would require the collation of a lengthened series of observations for their determination. On some days floating Hydrozoa occur in vast numbers; but when they do so, they usually appear to be all of the same species; nor are such days of frequent occurrence. The small gymnophthalmatous Medusidæ (naked-eyed Medusæ) are so transparent that it is impossible to see them from the ship, although they may be tolerably abundant; and it is only when they are captured in the towing-net that their presence is detected; and that must be, of course, in calm weather, when the ship is not sailing too fast. But the towing-net is seldom put down without securing various forms of such transparent Medusæ, as well as Beroës and similar oceanic Actinozoa, also small gelatinous masses usually more or less torn by contact with the net. The pelagic species of the order Physophoridæ, such as *Velella*, *Physalia*, and *Porpita*, occur perhaps more frequently than any others, and usually in company with one another, the two former especially seldom occurring one without the other, and having the appearance from a distance of large bubbles of water drifting by, though their persistence at once attracts the attention of the observant. Next to them, perhaps, are *Porpita*, looking like beautiful blue gun-wads, with delicate radiating markings, and surrounded with a fringe of deep-blue tentacles. The number of these Hydrozoa must be enormous, and their range very remarkable. I have found them extending over 55° of latitude, and I have no reason to believe this to be the limit.

It is not to be wondered at that these light bodies, which present more or less sail to the wind, should be blown ashore in a gale. Thus I have found a *Veleva* on the Lancashire coast; and abroad, as, for example, on Bush Island, at the mouth of Kelung Harbour, Formosa, after windy weather, I have seen thousands of the first two genera lying high and dry upon the rocks.

But the most magnificent specimens of these richly coloured animals (*Physalia*) occurred in the Atlantic Ocean, near the equator. On the 19th of June, in lat. 13' S. and long. 22° W., wind S.S.E., therm. 77°, bar. 30°·1, the sea was moderately calm, and from time to time during the day splendid individuals of *Physalia pelagica* sailed by, attracting attention, even when far off, by their large size and brilliant colours. They had the appearance of beautiful prismatic shells standing upright upon rich blue cushions, the shell being radiated from the base or cushion to the circumference, which was fringed with a rich and bright rose-colour. They were not in great abundance, but one would float by every five minutes or so.

The largest *Physalia* which I examined measured as follows:—

Extreme length of bladder	8 inches.
Greatest vertical circumference	10 $\frac{1}{4}$ „
Height of bladder above water	2 $\frac{3}{4}$ „

But this was considerably reduced from the natural height; for the rose-coloured crest had collapsed, which would have added at least $\frac{3}{4}$ inch to it, making a total of 3 $\frac{1}{2}$ inches in height above the water. I had judged them to be about 8 inches long, before I captured one, by the expedient of throwing into the water a piece of wood of ascertained length, which I carefully compared with the animal as it floated near it. No one on board the ship had ever seen such magnificent *Physaliae*, although they had been at sea many years. Some thought at first that they had seen them as large in the West Indies, but they were fain to confess at last that the large one I measured exceeded the largest they had ever seen. I saw these large *Physaliae* subsequently on more than one occasion, the last being in lat. 26° N., though higher than this somewhat smaller specimens occurred.

The stinging-propensities of these Hydrozoa were not generally known, but were destined to make themselves evident at the expense of one unfortunate man. A boat happened to be lowered early in the day; and one of the crew, seeing a large *Physalia* float within reach, took it up with his naked hand. The threads clung to his hand and arm, penetrating to the axilla and down the side; causing the man to yell with agony. He was quickly brought on board, and, as soon as he reached

the deck, ran about like a frantic maniac, so that it took several men to catch him, and, when secured and the proper remedies applied, he rolled about for a considerable time, groaning with pain. His arm was red, inflamed, and swollen, and remained so for some hours after the occurrence.

One circumstance in relation to these large *Physalia* struck me as being very remarkable. Each one as it floated by had beneath it what at first I took to be its mass of tentacles and polypites; but on more close observation I found that the appearance was due to a shoal of small fishes accompanying the hydrozoon under protection of its appendages. The fishes were of various sizes, from 2 to 6 inches long, transversely banded, and looking in the water precisely like the pilot-fish (*Naucrates ductor*). There were perhaps a dozen of these accompanying fish clustered together beneath the bladder of each *Physalia*. Every *Physalia* had its cluster; but this peculiarity was observable—viz. that under small *Physalia* the fishes were small, while under large specimens they were correspondingly large, being, in fact, always proportioned to the size of the man-of-war which they accompanied. Unfortunately I did not discover this curious fact till late in the day; and when the boat was down in the morning I was unaware of it, or I should have made a point of attempting to secure a specimen of so interesting a fish.

What the relation is which exists between the fish and the Hydrozoon I cannot say; but this correspondence between the sizes of the two animals seems to indicate that the fishes do not capriciously select their protecting Hydrozoon. It is known that certain fishes harbour in the threads of some of the large *Lucernaridæ*; but I believe they have not before been noticed accompanying *Physalia*.

The presence of these fishes also accounted for a remarkable thing I had observed earlier in the day. One of the large albicores made a sudden dash at a *Physalia* (apparently), but did not take it; returning, however, presently to the charge, he made a clean sweep, no trace of the *Physalia* being left. Doubtless it was the small fishes which accompanied it, rather than the *Physalia* itself, which stimulated the albicore's attack.

Before I quit the subject of the Physophoridæ, I must not omit to mention a circumstance which occurred only once during the whole time I was at sea—viz. the remarkable influx of *Stephanomiadæ*, accompanied by other kinds of animals, into Kelung Harbour, Formosa, on the 18th of June. The beautiful organisms I there observed were of the genus *Stephanomia*, and closely resembled the *S. triangularis* of Quoy and Gaimard. They were wonderfully sculptured and carved masses of solid jelly,

either perfectly transparent or tinged with pink. They would bear being taken up carefully in a hand-net and placed in a basin of sea-water, but, when there, became absolutely invisible from their transparency and delicacy, and, when touched, would break asunder into transparent, gelatinous, star-like bodies; so that I was of despair at getting even a sketch of their complicated forms, for they soon melted away into shapeless masses. I endeavoured to preserve some in glycerine, but without success, for they immediately fell to pieces and dissolved. These bodies were solid to the touch, about 3 inches long, and appeared to be formed by the union of gelatinous bodies (swimming-bells) of very complex form, and dissimilar at different parts of their length, so that the diameter of one-third was greater than that of the other two-thirds. I was much disappointed at my unsuccessful attempts to keep some record of them; but their invisibility, their fragility, and the approach of evening rendered all my attempts at that time futile; and although I might have succeeded better if I had had another opportunity, I never saw anything like them again.

But the circumstance to be especially remarked is that during all the time these curious animals were floating by, it was raining pretty hard—a condition which, *à priori*, would have been supposed the most unfavourable for them; for the destructiveness of fresh water to delicate marine animals is well known. Whence, too, could they have come in such profusion? And if the surface of the sea is their natural habitat, why are they not more frequently seen?

With regard to the Hydrozoa of the order Lucernaridæ (the covered-eyed Medusæ of Forbes), on the comparatively few occasions when they appear upon the surface, they are usually in great abundance, and not in great variety. Thus in the upper part of the Red Sea, on the 10th of March, a species of *Aurelia* appeared in great numbers; and two days after, we passed through a shoal of Rhizostomas. Four days later, in the Gulf of Aden, we again encountered shoals of *Aurelia*, apparently identical with those of the Red Sea, the two shoals being separated by about 1400 miles. Again, in October we passed, on the west coast of Borneo, off Cape Santubon, through a number of magnificent Pulmogrades. The upper part of the umbrella was pilose, with long papillæ; the periphery was fringed with long tentacles, and the pedicels gave rise to magnificent grape-like masses, the whole being of a delicate white colour, and fully 18 inches in diameter. In the following month, in the strait which separates the island of Singapore from the Malay peninsula, I observed a great number of the same beautiful Pelagian, and accompanying it some specimens of a small and

elegant, brown, turquoise-studded species, similar to one I had already obtained in Victoria Harbour, Labuan, and of which, it may be here mentioned, I found a small crab within the umbrella, beneath which it appeared to reside.

To show the vast numbers of these animals which swim freely in the ocean, I will mention that, in the Atlantic, in lat. $3\frac{1}{2}^{\circ}$ S. and long. 17° W., we encountered a shoal of these animals, all of the same species, the individuals of which were among the most beautiful in form and colouring that I have ever met with. Just before sunset we passed through them for a space of two hours, during which time we had traversed ten miles. Supposing that this shoal were at least as broad as long, it was easy to calculate roughly that there could not be less than thirty millions of individuals constituting it, an estimate probably far below the truth. I procured one, and made a careful drawing of it while still living.

The only exception I met with to the rule I have mentioned (namely, that when Hydrozoa floated they appeared in considerable shoals of one species only) occurred in the great calms which I encountered in the North Atlantic Ocean, in the first fortnight of July, and which extended more or less over upwards of a thousand miles, during which, on two or three occasions, I saw several species of Hydrozoa mingled with vast numbers of compound Ascidiæ. Some of them were new and strange forms, such as I have nowhere seen figured, some abundant, others but few in number, only appearing occasionally, and therefore very difficult to capture from a moving ship. One of these I did succeed in taking; but there were at least three or four species besides the *Physalia* and *Verella*.

It occasionally happened that the observation of a shoal of Hydrozoa pointed out some curious facts from which interesting deductions might be made. Thus, while passing through the Indian Ocean, in lat. 13° N., during an entire day (March 17), we ran through shoals of *Aurelia*, meeting from time to time patches in which they were too numerous to be counted, and in each of which there were many hundreds. A noticeable fact I remarked with regard to them, viz. that, without any exception that I could discover, these *Aureliæ* were, during the whole day, swimming in the same direction, or *with* the wind. We were steaming nearly due east, and a breeze was blowing a little south of east; and the umbrellas were all inclined one way, and pointing in the direction towards which the wind was blowing.

On another occasion, in a dead calm, on a beautiful day, off the river Min, I observed great numbers of a large white species. The edges of the umbrella were frilled, and numerous long and delicate threads stretched out straight and parallel; but what

struck me as singular was, that these threads did not all float in the same direction, as though drifted from the animal by wind or tide, but, although they were several feet long, they formed three or four distinct bundles, which stretched straight out in different, and often opposite, directions from the body of the animal, from which it appeared that they were propelled by a voluntary effort.

In passing through Banka Strait, owing to the number of rivers (Palembang and others) which flow out of the island of Sumatra, the water had only seven-tenths of the saltness of the ocean; but notwithstanding this comparative freshness, I observed a number of large white *Rhizostomas* floating just below the surface, apparently unaffected by this peculiar condition.

XLI.—*List of Coleoptera received from Old Calabar, on the West Coast of Africa.* By ANDREW MURRAY, F.L.S.

[Continued from p. 95.]

Lymexylonidæ.

ATRACTOCERUS, Palis. Beauv.

Atractocerus africanus, Boh. Ins. Caffr. i. 520.

A single specimen.

I have not seen any typical specimen of Boheman's *A. africanus*; but mine agrees perfectly with his description, and differs from the well-known *A. necydaloides* of Latreille in the particulars which Boheman points out. "At first sight," says he, "very similar to *A. necydaloides*, but is well distinguished from it by the head being ovate, the thorax longer, narrower, oblong-quadrate, and without a reflexed margin behind."

It would appear to range across Africa, and also into Madagascar; for I have seen specimens (probably *A. madagascariensis* of Castelnau) from that country which did not differ from this Old-Calabar species.

*MELITTOMMA**, nov. gen. (See fig. 1, p. 316.)

Hylocæto similis, sed magnis oculis sine ocellis et thorace elongato.

Habit and facies similar to those of *Hylocætus*; the antennæ imbricated strongly in the male, subserrated in the female; the palpi as in *Atractocerus*; the head with very large eyes, as in *Atractocerus*, covering the whole sides of the head and nearly

* From μέλιττα, a bee, and ὄμμα, an eye,—bee-eyed.